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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,110	02/01/2007	Masataka Nakamura	360842012600	1217

25227 7590 03/24/2011  
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EXAMINER
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MOHADDES, LADAN

ART UNIT	PAPER NUMBER
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1726

NOTIFICATION DATE	DELIVERY MODE
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03/24/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

EOfficeVA@mofo.com  
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PatentDocket@mofo.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/562,110	<b>Applicant(s)</b> NAKAMURA ET AL.	
	<b>Examiner</b> LADAN MOHADDES	<b>Art Unit</b> 1726	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 2 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/23/2010</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3-9, 12-14 and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO).

With respect to claims 1, 3-9, 12-14 and 16-17, CABASSO discloses a solid polymer electrolyte membrane for fuel cell (as in claim 1, 12-14 and 16-17) comprising: sulfonated poly phenylene oxide blended with poly vinylidene fluoride (Applicant's polymer A and cross linked polymer B, respectively, as in claims 1, 3-9) (col 5: In 49-56). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claim 1), if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant.

3. Claims 1, 3-9, and 12-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Prakash et al. (US 6444343, already of record, hereafter referred to as PRAKASH).

With respect to claims 1, 3-9, and 12-17, PRAKASH discloses a solid polymer electrolyte membrane for methanol fuel cell (as in claim 1, 12-17) comprising: polystyrene sulfonic acid blended with poly vinylidene fluoride (Applicant's polymer A and B, respectively, as in claims 1, 3-9) (col 5: ln 21-27, ln 36-42 and ln 51-52). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claim 1) if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant.

4. Claims 1, 3-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Campbell et al. (EP 0224020, already of record, hereafter referred to as CAMPBELL).

With respect to claims 1, 3-11, CAMPBELL discloses a polymer comprising: polyphenylene ethers (oxide) (as in claims 1, 33 and 5-8) or poly alkylene dicarboxylate (as in claim 4) (pages 5, 8, and 12, Applicant's polymer A) and polysiloxane with formula VIII (pages 16-17) (as in claims 1 and 9-11, applicant's cross linked polymer B). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claim 1), if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant. Also, as stated in *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298,

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1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999) "if the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction".

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 3-14 and 16-17 are rejected are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al. (EP 0224020, already of record, hereafter referred to as CAMPBELL) in view of Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO).

With respect to claims 1, 3-14 and 16-17, CAMPBELL discloses a polymer comprising: polyphenylene ethers (oxide) (as in claims 1, 33 and 5-8) or poly alkylene dicarboxylate (as in claim 4) (pages 5, 8, and 12, Applicant's polymer A) and polysiloxane with formula VIII (pages 16-17) (as in claims 1 and 9-11, applicant's cross linked polymer B). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claim 1), if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant. CAMPBELL does not expressly disclose that the polymer is a polymer electrolyte. However, CABASSO teaches copolymers of poly phenylene oxide for use as polymer electrolyte membrane for fuel cells (as in claim 1 and 12-14 and 16-17) for the benefit of having a low cost, easy to prepare ion-exchange membrane with favorable mechanical and chemical properties for use in fuel cells. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use the copolymer if CAMPBELL as a polymeric

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membrane in fuel cell of CABASSO for achieving favorable mechanical and chemical properties.

9. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO) as applied to claims 1, 3-9, 12-14 and 16-17 above, and further in view of Muller (US 6777116, hereafter referred to as MULLER).

With respect to claims 15 and 18, CABASSO does not expressly disclose a direct type fuel cell with water and alcohol having a carbon number of 1-3 as the fuel. However, as shown by Muller direct type fuel cells comprising proton conducting electrolyte using water and dimethyl ether or methanol as fuel are well known in the art (col 3: ln 38-52). As stated rationales in *KSR International v. Teleflex Inc.* (550 USPQ2d 1385):

- (a) Combining prior art elements according to known methods to yield predictable results;
- (b) Simple substitution of one known element for another to obtain predictable results;
- (c) Use of a known technique to improve similar devices, methods, or products in the same way;
- (d) Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;

- (e) "Obvious to try" - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (f) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) Some teaching, suggestion, or motivation to combine prior art references that would have led one of ordinary skill to modify the prior reference teachings to arrive at the claimed invention;

establish a prima facie case of obviousness. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use direct type fuel cells with dimethyl ether/methanol and water fuel cells with the polymer electrolyte membrane of CABASSO as so is within the design choice of the practitioner in the art. The Examiner notes that above rationales are merely exemplary. For more information, see MPEP § 2141.

10. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al. (EP 0224020, already of record, hereafter referred to as CAMPBELL) in view of Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO), and further in view of Muller (US 6777116, hereafter referred to as MULLER).

With respect to claims 15 and 18, CAMPBELL in view of CABASSO does not expressly disclose a direct type fuel cell with water and alcohol having a carbon number



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of 1-3 as the fuel. However, as shown by Muller direct type fuel cells comprising proton conducting electrolyte using water and dimethyl ether or methanol as fuel are well known in the art (col 3: ln 38-52). As stated rationales in *KSR International v. Teleflex Inc.* (550 USPQ2d 1385):

- (a) Combining prior art elements according to known methods to yield predictable results;
- (b) Simple substitution of one known element for another to obtain predictable results;
- (c) Use of a known technique to improve similar devices, methods, or products in the same way;
- (d) Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;
- (e) "Obvious to try" - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (f) Known work in one field of endeavor may prompt variations of it for us in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) Some teaching, suggestion, or motivation to combine prior art references that would have led one of ordinary skill to modify the prior reference teachings to arrive at the claimed invention;

establish a prima facie case of obviousness. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use direct

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type fuel cells with dimethyl ether/methanol and water fuel cells with the polymer electrolyte membrane of modified CAMPBELL as so is within the design choice of the practitioner in the art. The Examiner notes that above rationales are merely exemplary. For more information, see MPEP § 2141.

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prakash et al. (US 6444343, already of record, hereafter referred to as PRAKASH) as applied to claims 1, 3-9 and 12-17 above, and further in view of Muller (US 6777116, hereafter referred to as MULLER).

With respect to claim 18, PRAKASH discloses direct methanol fuel cell (col 3: In 28-32) but does not expressly disclose water alcohol having a carbon number of 1-3 as the fuel. However, as shown by Muller direct type fuel cells comprising proton conducting electrolyte using water and dimethyl ether as fuel are well known in the art (col 3: In 38-52). As stated rationales in *KSR International v. Teleflex Inc.* (550 USPQ2d 1385):

- (a) Combining prior art elements according to known methods to yield predictable results;
- (b) Simple substitution of one known element for another to obtain predictable results;
- (c) Use of a known technique to improve similar devices, methods, or products in the same way;

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- (d) Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;
- (e) "Obvious to try" - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (f) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) Some teaching, suggestion, or motivation to combine prior art references that would have led one of ordinary skill to modify the prior reference teachings to arrive at the claimed invention;

establish a prima facie case of obviousness. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use direct dimethyl ether and water as fuels for fuel cell of PRAKASH as so is within the choice of the practitioner in the art and thought by prior art. The Examiner notes that above rationales are merely exemplary. For more information, see MPEP § 2141.

### ***Response to Arguments***

12. Applicant's arguments filed 01/20/2010 have been fully considered but they are not persuasive.

On pages 6-10, the Applicant has argued that "Accordingly, the performance of an electrolyte is influenced not only by the amount in the electrolyte but also the "state of existence" of the water within the electrolyte. As explained in the specification page 8,

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line 35-page 9, line 7 "the polymer electrolyte of the present invention is a polymer electrolyte where proton conductive polymer (A) and polymer (B) that is different from (A) are mixed, and polymer (B) constrains the molecular chains of proton conductive polymer (A), and thereby, the amount of low melting point water and bulk water is suppressed, increasing the ratio of unfreezable water, and thus, it can be conceived that high proton conductivity and low fuel crossover can be achieved at the same time." Accordingly, the "state of existence" of the water within the electrolyte depends upon the selected amounts and combinations of polymers used in the electrolyte and would not simply be inherent to all polymers electrolytes including a polymer (A) and a polymer (B).". The examiner respectfully disagrees and points out to paragraph [0019] of the Applicant's published application as below:

*[0019] The ratio of the amount of unfreezable water, represented by formula (S1) and the content of unfreezable water, represented by formula (S2), are found in accordance with a differential scanning calorimetry analysis (DSC) method. That is to say, a polymer electrolyte is immersed in water at 20 °C for 12 hours, and after that, taken out from the water, and excessive water that clings to the surface is removed by drying the surface with gauze as quickly as possible, and then, the polymer electrolyte is placed in a sealable type sample container made of aluminum with an alumina coating, of which the weight (Gp) has been measured in advance, which is then clamped shut, and after that, the total weight (Gw) of the sample and the sealable type sample container are measured as quickly as possible, and DSC measurement is immediately carried out. In accordance with the temperature measuring program, the*

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*polymer electrolyte is cooled from room temperature to -30 °C at a rate of 10 °C /minute, and after that, the temperature is increased to 5 °C at a rate of 0.3 °C/minute, and the amount of bulk water  $W_f$  is found from the DSC curve of this temperature raising process using the following formula (n1), the amount of low melting point water  $W_{fc}$  is found using formula (n2), and these are then subtracted from the total content of water, and thereby, the amount of unfreezable water  $W_{nf}$  is found...*" [Emphasis added].

Therefore, as seen above, the formula disclosed in claim 1 is not "state of existence" of water within the electrolyte, but merely a method of measuring properties of the polymer electrolyte.

For the above reason, the examiner maintains her position that if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant, the same formula will apply for the measurements performed as described in paragraph [0019]. Also again, as stated in *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999) "if the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction".

### **Conclusion**

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13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LADAN MOHADDES whose telephone number is (571)270-7742. The examiner can normally be reached on Monday to Thursday from 8:30 AM to 6:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LADAN MOHADDES/  
Examiner, Art Unit 1726

/Patrick Joseph Ryan/  
Supervisory Patent Examiner, Art Unit 1726